

GENERAL MAGAZINE

Commentary

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Déjà Vu, All Over Again?

The Environmental Protection Agency (EPA) has begun a process to examine possible approaches and partnership opportunities to promote water efficiency in the residential, commercial and industrial sectors. If a national program were to be implemented, it would seek to increase water efficiency by informing water users of the advantages of water-efficient products, motivating manufacturers to produce more water-efficient products, and encouraging distributors, retailers and local water utilities to promote these products. Efficient water use can have major environmental, public health and economic benefits by helping to improve water quality, maintaining ecosystems and protecting drinking water resources. If wise water use is put into practice it can help to mitigate the effects of drought and save homeowners money on water and energy bills without compromising convenience or performance.

One of the tools under consideration is a water efficient product labeling program that would be based on EPA's highly successful ENERGY STAR program, a government-backed program to protect the environment through superior energy efficiency. Under that program, manufacturers voluntarily have their products tested to meet efficiency and other performance standards to ensure that the labeled products not only meet environmental goals, but consumer needs as well.

According to the EPA, there is significant support for product labeling from a broad range of stakeholders including water systems, manufacturers, retailers, municipalities, states, water industry organizations and environmental groups. The types of products the Agency would consider evaluating could include plumbing products, appliances, and landscape irrigation devices, being careful to proceed in areas where there would be clear benefits beyond those from activities already under way, such as the Energy Star program or national plumbing standards.

Getting Started

One of the first steps the EPA has taken was a stakeholder meeting held on October 9, 2003 in Washington, D.C. There are to be other such stakeholder meetings over the next year. After soliciting stakeholder comments, the EPA would then evaluate the best available information to choose and develop the most cost-effective way to achieve the Agency's goals of saving water and reducing water and wastewater infrastructure needs nation-wide.

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Water Efficiency Labeling: First Stakeholders Meeting

The first feelings of unease about this program came about after hearing the first group of "stakeholders" make presentations about the proposed program. The first panel discussion was a State, Local and Public Perspective. It's hard to argue with environmentalists, flag-wavers, and supporters of motherhood and apple pie. Their intent is good. What they propose often makes sense and can save, or at least extend the resources of Planet Earth.

But, the first impressions were indelible reminders of the previously mandated low-flow water closets foisted upon an unsuspecting populace. Back in the 90's, with virtually no research having first been attempted to ascertain the implications of not only the design and manufacturing problems associated with a low-flow water closet, but with no regard to then having to install it on systems that had not been prepared for the product and in fact, were designed for a totally different water closet product. The Energy Efficient Act of 1992, mandating low flow water closets became required by the federal government.

Ten Years Later

The Water Efficiency Labeling program being examined by the EPA is a good example of another good intention of creating yet another fine environmental savings program. But, is this another case of the federal government in a rush to embrace a popular concept? Of once again rushing forward with an environmentally popular and endorsed program with the end result to be something inherently and perceptionly exciting and acceptable; embraced wholeheartedly by an unsuspecting populous? Will history repeat itself and once again will the best intentions for what could and should be a great idea instead become a scrounge let loose on the American public?

This Time, Research?

This time, the idea endorses promise that things will be different. Yes, there will be research. But, from what was made very clear in during the panel presentations and the discussions that followed, the current research plan to be undertaken is for the evaluation of water efficiency; how to save the resource. This research will provide a method of establishing performance criteria on various products, everything from bathroom fixtures, to kitchen fixtures, to irrigation systems. And what's that mean? The more efficient a product is judged, the more water saving can be expected. Consumers can then have a choice of their participation in the use of Earth's resources; with the term "virtuous cycle" being one of the new buzz words.

What seems to be missing? Why how all these separate and independently tested and evaluated water efficient products will behave when installed on new or retrofitted on older plumbing systems. There doesn't seem to be a plan for any Engineered Plumbing research. And, especially integrated research.

Déjà Vu, All Over Again (Continued)

For now, the bulk of consideration is on how efficient a product will be in the use of water. How cost effective it will be to the consumer. Whether the product will meet the imposed performance criteria.

What doesn't seem to have been considered is the vital research necessary to determine how each of these water efficient products are going to work in the entity known as the "plumbing system." How will each of these water saving products interact with each other? What new engineered plumbing designs will need to be created and considered in order that the intended result, water efficiency, is truly achieved? How will each of these devices react in a retrofit environment, for a plumbing system already in place that has not been engineered to accept such new water savings products?

Law of Unintended Consequences

Without belaboring the problems that occurred when the first low-flow water closets were introduced, it is instructive to examine the law of unintended consequences. These new mandated water closets were inspired to save water. They were to be labeled. They were limited to a total amount of 1.6 gallons per flush. There is even an ANSI standard that provides the criteria for a minimum performance standard for all water closets.

What was clearly missing and totally ignored, was any research to determine how these resource-efficient and environmentally proper fixtures would act on the immense plumbing system infrastructure that was already in-place. Nor was any thought given to the years of code and construction standards that were already in-place, but were geared to, and had been engineered and designed to insure safe and effective plumbing systems, but, for entirely different water closet fixtures.

It has taken the manufacturing community over six years of new design and production methods to field a low-flow water closet that does not immediately raise the ire of the consumer. Similarly, it has taken a like-amount of time for the engineers, designers, and code and standards setting organizations to provide for the plumbing system adaptations necessary for consistent, proper and effective use of these fixtures.

Manufacturers had to initially expend tremendous amounts of energy and resources and undertake a herculean effort to meet the untested and un-researched federal mandates. However, the then existing plumbing system infrastructure was just not engineered and designed to work properly with the early low-flow water closet models.

With 20/20 hindsight, it is easy to see that the very fact of the water efficient water closet was a disaster waiting to happen. With mandated retrofitting during remodeling and construction for these fixtures and the continuation of new construction using the older standards and codes, the floodgates of consumer irritation opened. Although much of the difficulties publicized were often more anecdotal than rigorous data collection, drainlines became clogged more frequently, toilets needed to be flushed more often, thus negating the concept of resource conservation, and there were complaints of non-operating fixtures.

Low-flow water closets reduced the amount of water used in a toilet flush from 3 to 5 gallons of water to 1.6 gallons of water. The result, less water to move fecal matter and other bulk media that consumers were used to disposing of in toilets. Less water meant that bulk material would not be carried as far within drainlines. The drainlines themselves were standardized with 4" diameter piping. Thus, with less water, the cross-section of the water course was flattener, providing less flow of water (3" diameter pipes were later found to help as the cross-sectional flow would be greater than in the wider diameter piping).

And so, the purpose behind the environmentally correct concept became subverted: consumers incurred increased costs as they had to call plumbers more frequently to clear clogged lines; to clear toilets and attempt to clear piping, consumers would double and triple flush using even more water than the older water closets. Blame was spread everywhere: engineers and designers were blamed for not designing proper plumbing system designs; contractors were blamed for incorrect installations, and manufacturers were blamed for producing a faulty product. It was a time of anger and angst for the consumer and the environment.

Continued Ignorance?

Even today, over eight years later since the debacle of the mandated low-flow water closet, there has still not been significantly rigorous research to determine the effects of lower water flow in older and even the newer designed plumbing systems. And, even with this known lack of information, the federal government is once again on the track to create a program of additional water efficient fixtures and appliances for the consumer.

A noble task indeed! But at what cost and to whom? Just because a consumer, in the interests of being more environmentally aware purchases a product with a water efficient label, what research has been performed to insure it will work with the plumbing system it is going to be attached to? Even more exasperating is whether all these water efficient devices connected to the same plumbing system will work in unison or cause unintended and unexpected problems. (Sounds like the computer and software dogma coming to a building near you. Install some software program on a computer that refuses to work and try to get it fixed by calling the manufacturers. The software advice is, "The problem is inside your maching." The computer company's advice is, "The problem is with the software.")

Déjà Vu, All Over Again (Continued)

Mayhem Waiting?

So, what possible effects can occur by installing multiple water-efficient labeled devices that have been judged to use thimble-full amounts of water? Consider reduced water bathroom fixtures that are upstream of a water closet, such as, minimal use showers, stingy bathtubs and water droplet sinks. Will the current plumbing system be able to consume that much less water and still be able to move and clear bulk material into the drainline? Will reduced water flow behind the discharge from a low-flow toilet create even more clogging and congestion in the plumbing system?

With such great water efficiency the amount of liquid being available through sanitary systems will be considerably reduced. What effect will this have on sewer treatment plants? Will there be so little liquid available in the waste stream itself that the facilities will have to add water in order to process waste and thus negate the savings?

What about other plumbing-type systems that are engineered and designed for the interrelationship of fixtures and piping, such as an irrigation system. Today's irrigation systems are designed and installed with computer controls, moisture detectors, pressure valves, backflow preventers and the like. Along comes a new super water efficient sprinkler head. The environmentally friendly consumer purchases and installs all new sprinkler heads. Will the system still work? Will it become less efficient and actually use more water?

Plumbing systems, regardless of the type, are engineered and designed to work in concert with know attachments, water pressures and where necessary, disposal and removal systems.

False Idol?

Throughout the presentations at this first ever "stakeholders" meeting, there were continual references to the Department of Energy's very successful energy-labeling program, Energy Star. Example after example were given as to how well this program worked; how it has become an industry standard; and, how it has saved tremendous amounts of energy.

The Energy Star program provides for performance criteria for energy using products such as washing machines, air conditioners, and the like. Interestingly, when the question from the audience referenced the low-flow water closet and its difficulties the initial response was that this new water efficient labeling program would be different: there would be no mandated performance standards. However, as the presentations proceeded, it became apparent that even though the water saving standards for a device to receive a water efficient label would not be "mandated," the device would still have to meet predetermined criteria which in and of itself, would be providing performance standards. Perhaps, even thought it is not federally mandated by an act of Congress, product manufacturers would strive to meet the lower water flow requirements in order to receive a water efficient label and thus remain competitive in the marketplace. Mandated or not, there will be significant performance standards and criteria affecting all water using products.

As more information about the Energy Star program was introduced, it soon became obvious that there was a huge gulf of difference between that program and the proposed Water-Efficiency Labeling program. First, one of the presenters indicated some of the examples of products that could not or did not receive an Energy Star label. One was for home insulation. Why couldn't it be labeled? Because it would be installed in different homes and where environmental conditions would be dissimilar such as drafty windows and doors, chimneys, and other factors. Another example of a product not getting an Energy Star label was for a super efficient electric motor that was intended for aftermarket installation in a product. Why not label it? Because, once again, the motor was not part of the original design of the product that met the performance criteria and therefore received the original label.

(Oops, doesn't this sound like the similar problem faced when there's a plumbing system involved?)

Then there are the completely dissimilar products, systems and resources that are involved. For Energy Star labeling, the product is given a performance rating on how much less energy is going to be used than a device that does not have a label. The resource being saved is electrical energy (for the Water efficient label, the resource is, water). One of the simplest example is of two refrigerators, one with and one without energy saving labels. Both refrigerators will keep the food at the proper cold temperature, one will just do it more efficiently (for water efficiency, the example could be two sinks, the labeled one would use less water than the unlabeled one).

So what's the biggest difference? The biggest difference is, that with the Energy Star system, there are only two parts to the equation: saving of energy, and performance standards. For the Water efficient labeling program there are three parts to the equation: the saving of the resource water, a performance standard, and the immediate removal and disposal of waste, unused and unwanted excess water.

Revisiting the Law of Unintended Consequences

One of the suggested potential methodologies suggested within the Water efficient labeling description material was the greater use of areator devices on fixtures. These devices would reduce water use by providing flow restrictions while seemingly continuing to provide expected results for the consumer (e.g., body coverage in a shower). However, the when considering areators, there also needs to be concern over the possibility of an aerosol result; areator's that dispense as an aerosol, has the potential for untold misery. Using an areator/aerosol device would provide "misting" levels of water droplets.

This type of water dispersal would permit the micro-sized drops to be absorbed into the lungs (spray devices such as a shower head are not designed to provide an aerosol spray and thus do not produce sufficiently fine enough droplets to be absorbed into the lungs). The unintended result: the spread of legionella and other potentially dangerous organisms found in virtually every water system.

A “Small” Matter of Scale

There was a significant void obvious throughout this first meeting. Although not exactly ignored, the bulk of the presentations at this meeting and virtually all of the information and material presented concentrated on residential homes and households. Completely missing at this time is the savings effects from commercial, industrial, institutional and large-scale residential dwellings such as apartment towers. It would take the water savings of hundreds of even “large” homes of 4,000 or 8,000 or 12,000 square feet situated on an acre or so of land (the typical sized home in today’s marketplace is about 1,500 to 2,500 square feet and is often sited on a quarter of an acre or less) to equal the potential water savings for a the number of residential apartment towers or office buildings built on the same sized piece of land, and with a similar footprint.

Who Are the Stakeholders?

Perhaps the most disappointing aspect of this first “stakeholders” meeting was the obvious exclusion, accidental or intended, of a broad representation of interested parties as panelists or involved in making presentations. Despite protestations of being untrue, there seemed to be a complete lack of notification or attempt to identify additional, potentially very important stakeholders who could have provided a balance to the presentations and panelists who may well have provided unasked or unconsidered perspective and especially technical insight. (There were a few fixture manufacturer representatives in the audience, and of course, a representative of the American Society of Plumbing Engineers also was in attendance. For ASPE, at least, there was never any formal or informal invitation or information provided regarding this meeting. Rather, ASPE’s attendance was a combination of “luck,” monitoring of the Internet, and prior knowledge of the program being under consideration due to a chance conversation.)

Equally frustrating, was this same lack of other “stakeholders” in the audience. Again, for whatever reason, there was a huge void in audience participation that would have provided a much more balanced and representative gathering. How can anyone justify and gloss over the fact that the audience was virtually void of technically competent organization representatives, manufacturers’ representatives, engineers, contractors and building trades representatives?

Who was there? The preponderance of presenters and panelists were environmentalist individuals and organizations, local, state and federal representatives (California Urban Water Conservation Council, East Bay Municipal Utility District, Friends of the Earth, EPA), a few water related associations (Canadian Water and Wastewater Association, Irrigation Association) and some manufacturers and retailer (e.g., Home Depot, Rain Bird, Association of Home Appliance Manufacturers).

Who was missing? There were no panelists or presenters from any of the engineering or manufacturer related organizations. Nor were there any panelists or presenters from any of the construction, building, installers and related organizations. Conspicuously absent were the American Society of Plumbing Engineers; the Plumbing Heating and Cooling Contractors; the American Society of Heating, Refrigeration and Air-Conditioning Engineers, International; the American Society of Sanitary Engineering; Plumbing Manufacturer’s Institute; Plumbing Contractors Association; Mechanical Contractors of America Association; Home Builders Association; to name just a few. Also conspicuously missing were representatives from any technical research organizations, especially colleges and universities, currently engaged in plumbing and related research; technical consultants with plumbing and engineering expertise; and building trade representatives (e.g., plumbers, installers)

Looking to the Future

Along with the who was missing, is the all important what was missing. As a direct result of the lack of balance representation of presenters and panelists, and taking into account that this was the first of what is proposed to be other “stakeholder” meetings, the most glaring omission, obvious to everyone in the audience was the lack of a equality in the information and material provided. This omission provided a very unsatisfactory first experience and introduction to the proposed Water-Efficiency Labeling program.

If the Environmental Protection Agency was trying to create a “stealth” program introduction, they definitely succeeded. However, if the EPA wants to create a truly useful, successful and result oriented program, it needs to do a much better job of attracting a broader spectrum of stakeholders. To do otherwise, will continue to undermine the very foundation of their proposed program. With this auspicious beginning, the agency will now have to attract and entice a large missing spectrum of stakeholders, repair its public relations failure, provide technically competent information and material, support technical research that will provide for the integration of water using and plumbing products with plumbing systems, and somehow coalesce a broad spectrum of now missing stakeholder into program supporters. To do otherwise, is to invite not only a vocal group of detractors, but the potential for a disaster that would undermine the confidence in, if not the existence of the EPA.

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[More information on water efficiency can be found at: http://www.epa.gov/water/water_efficiency.html]